Report on the Collection of Water Quality Data

For the Development of

Total Maximum Daily Loads

for

***E. coli* Bacteria**

in the

Kankakee River

Lake and LaPorte Counties, Indiana

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Reviews and Approvals

Assessment Branch Chief _____ Date _____

Surveys Section Chief_____ Date _____

TMDL Program Manager_____ Date _____

INTRODUCTION

This report summarizes the sampling and the results of tests conducted in accordance to Sampling Plan for the Collection of Field Data for the Development of Total Maximum Daily Loads for *E. coli* Bacteria in the Kankakee River, Lake and LaPorte Counties, Indiana. The plan was prepared by Roseann Hirschinger and Stephen Boswell of the Surveys Section, Assessment Branch, Office of Water Management, Indiana Department of Environmental Management in May 1999. The survey's purpose was to identify areas of concern and to quantify the degree of contamination occurring along each segment of the waterbody. The reader is referred to that plan for all details of the project's methods and materials. This document points out changes that were made in the scope of work described in the sampling plan and reasons for those changes.

GENERAL INFORMATION ON THE WORK PERFORMED

Study Area
The study area includes the Kankakee River from the headwaters at Dixon West Place Ditch in St. Joseph County to the Indiana/ Illinois State Line and major tributaries flowing into the north side of the river. The listing of the river as an impaired waterbody was based on results of historic fixed station sampling in Lake and LaPorte Counties. This study enumerates the concentrations of *E. coli* throughout the main stem and contributing tributaries.

Sampling Locations
Sampling locations totaled 32 sites, and included 21 on the main stem of the Kankakee River and 11 on tributaries on the north side of the Kankakee River. One site, at U.S. 231 over the Kankakee River, was added after the pre-survey because results at that point in the river would also be needed for the Cobb Creek TMDL report. See Appendix I, "Sample Locations Information and Route Maps", of the Sampling Plan for details on the location of the other 31 sites.

Dates of Sampling
The sampling for this project began on August 2, 1999. It was completed on September 2, 1999.

Program Objectives
This survey confirmed the need to control non-point sources of pollution on the Kankakee River. The *E. coli* test results and the general chemistry and nutrient analyses can be used for the modeling of surface water quality changes needed to correct impairments under low flow conditions. Current conditions and degree of pollution were shown to be moderate, but consistent throughout the developed part of the Kankakee River.

Information on stream characterization and natural and man-made influences on the watershed was not gathered during this survey. An inspection by watercraft of the river banks and drainage discharges is suggested to inform the TMDL work group of sources of contamination. The information about sources will be needed and subsequently used both in public outreach and in computer modeling programs to simulate the effects of proposed or anticipated changes on the watershed's water quality.

Four members of the TMDL work group were trained during this survey. Each staff member was trained in water quality sampling, Hydrolab calibration, and field calibration checks for four days during this survey.

PROJECT DESCRIPTION

Surface Water Sampling

The sample routes were established in the pre-survey. Generally, staff collected samples from 7:30 AM until 12:00 noon. Samples were usually taken in the western stream reach on the first day, the middle stream reach on the second day, and the uppermost reach on the third day. There were some variations in this schedule due to the need to collect general chemistry and nutrient samples on the day staff were returning to Indianapolis. All samples were delivered to the laboratories within the required holding times of six hours for E. coli testing and 48 hours for the general chemistry and nutrient testing.

Each week, general chemistry and nutrient samples were taken in addition to the *E. coli* samples (see Sampling Plan). All the sites could not be sampled on the same week due to time and space limitations, but each site was sampled to provide general chemistry and nutrient data for the modelers. The results section of this report includes the sampling dates and assigned laboratory numbers for general chemistry and nutrient analysis for each site. No general chemistry and nutrient violations were detected in these tests.

Also included in the results section are geometric means of samples taken earlier in the season by the United States Geological Survey (USGS) in a survey of the Kankakee Watershed conducted under contract to IDEM as part of an assessment of the whole Kankakee River Watershed. These results were made available to Surveys Section as part of a data sharing agreement and are included in this report for comparison purposes only. A full report including flows and field data will be published by the USGS in the near future.

Field Data

A stream sampling field sheet was completed for each sample collected. Data concerning field tests, weather and site locations were entered into the *E. coli* database using Access. Staff were able to use Surveys Section's Hydro-lab # 10 throughout the five-week study. Calibration drift values were minimal as recorded in the calibration documentation. Calibration was performed each Monday with standard solutions and also field checked on a daily basis.

Flow Measurements

Two of the gage stations listed in the work plan were not used. West Creek no longer has a gage and Singleton Ditch data for the summer of 1999 was not downloaded and saved. Flow measurements were not taken in conjunction with the general chemistry and nutrient sampling. The river is very slow flowing and deep, thus extremely difficult to measure cross-sections and velocity. Analysis of the *E. coli* data in this report includes flows at all other gages listed in the Sampling Plan at the time of sampling and includes historic averages for comparison.

Summary of Results

Sampling stations on the Kankakee River listed below begin at the headwaters and continue downstream to the State line. Tributaries are listed in the order of convergence with the river. Each station has the results of the TMDL survey and the USGS survey expressed as the geometric mean of five samples taken in a 30-day period. Results exceeding 125cfu / 100 mL are in bold print. Also listed is the date and sample number of general chemistry and nutrient samples taken at each site. Flow data are noted for each sampling station which has a USGS gage station. Included are historic flows to aid in relating *E. coli* concentrations with hydraulic conditions at the time of each survey for modeling purposes.

	Surveys Section	USGS
	8-2 to 9-3	**6-29 to 7-27**

L012004 Dixon West Place Ditch SR 132, N OF LIBERTY 66
General chemistry and nutrient sample taken August 12, 1999 DA 14316

L012003 Kankakee River CR 300 S, USGS GAGE N LIBERTY MP 126.9 55 **270**
General chemistry and nutrient sample taken August 12, 1999 DA 14315

1999.08.04 12:00:00	78 cfs	2.45 ft, steady
1999.08.12 13:00:00	65 cfs	2.23 ft, rising
1999.08.18 12:00:00	65 cfs	2.23 ft, falling
1999.08.25 11:00:00	103 cfs	2.82 ft, rising
1999.09.02 11:00:00	74 cfs	2.38 ft, falling

The USGS 1999 Water Year monthly mean flow of 108 cfs in August 1951-1999
monthly max. flow of 273 cfs in August 1951-1999
monthly min. flow of 63.1 cfs in August 1951-1999

L012002 Kankakee River SR 4 SE OF FISH LAKE **154**
General chemistry and nutrient sample taken August 12, 1999 DA 14314

L012001 Kankakee River SR 104 AT KANKAKEE **258**
General chemistry and nutrient sample taken August 12, 1999 DA 14313

L012118 Kankakee River US 6 BRIDGE, S OF KINGSBURY FWA. **184** **360**
General chemistry and nutrient sample taken August 12, 1999 DA 14312

L017010 Kankakee River LaPorte CR 1200 S BRIDGE 125
General chemistry and nutrient sample taken August 12, 1999 DA 14311

L017009 Travis Ditch-Long Ditch CR 1200 S **430** **530**
General chemistry and nutrient sample taken August 12, 1999 DA 14310 and DA 14318

L017008 Salisbury Ditch BRIDGE ON LaPorte CR 1300 S **355**
General chemistry and nutrient sample taken August 12, 1999 DA 14309

L017002 Kankakee River US HWY 30, DAVIS, USGS GAGE MP110.9 **200**
General chemistry and nutrient sample taken August 12, 1999 DA 14308

1999.08.04 08:00:00	270 cfs	6.20 ft, falling
1999.08.12 09:00:00	227 cfs	5.84 ft, rising
1999.08.18 09:00:00	218 cfs	5.76 ft, falling
1999.08.25 10:00:00	306 cfs	6.48 ft, rising
1999.09.02 09:00:00	236 cfs	5.92 ft, falling

The USGS 1999 Water Year monthly mean flow of 363 cfs in August 1926-1999
monthly Max. flow of 804 cfs in August 1926-1999
monthly Min. flow of 174 cfs in August 1926-1999

L017007 Robbins Ditch RANGELINE RD **268**
General chemistry and nutrient sample taken August 12, 1999 DA 14307

L017006 Kankakee River SR 39 BRIDGE **169** **370**
General chemistry and nutrient sample taken August 12, 1999 DA 14306

L014036 Kankakee River SR 8 BRIDGE **167**
General chemistry and nutrient sample taken August 12, 1999 DA 14305

L014035 Kankakee River LaPorte CR 650 W **395**
General chemistry and nutrient sample taken August 26, 1999 DA 14330 and DA 14334

L017003 Yellow River LaPorte CR 650 W **338**
General chemistry and nutrient samples taken August 26, 1999 DA14331

Data from gage station at Knox

1999.08.03 11:00:00	191 cfs	5.25 ft, falling
1999.08.11 11:00:00	96 cfs	4.96 ft, falling
1999.08.19 11:00:00	99 cfs	4.97 ft, falling
1999.08.26 11:00:00	209 cfs	5.21 ft, steady
1999.09.01 11:00:00	123 cfs	4.95 ft, falling

The USGS 1999 Water Year monthly mean flow of 209 cfs in August 1944-1999
monthly Max. flow of 652 cfs in August 1944-1999
monthly Min. flow of 93.6 cfs in August 1944-1999

L017005 Kline Arm of Yellow River LaPorte CR 650 W **233**
General chemistry and nutrient samples taken August 26, 1999 DA 14332

L014034 Kankakee River US 421 BRIDGE **324**
General chemistry and nutrient samples taken August 19, 1999 DA 14328

L014001 Kankakee River, DUNNS BRIDGE, USGS GAGING STA MP 90.8 **202** **170**
General chemistry and nutrient samples taken August 19, 1999 DA 14327

1999.08.04 10:00:00	622 cfs	2.69 ft, falling
1999.08.11 12:00:00	489 cfs	2.20 ft, steady
1999.08.19 10:00:00	453 cfs	2.06 ft, rising
1999.08.26 05:00:00	613 cfs	2.66 ft, rising
1999.09.01 10:00:00	460 cfs	2.09 ft, falling

The USGS 1999 Water Year monthly mean flow of 853 cfs in August 1949-1999
monthly Max. flow of 2316 cfs in August 1949-1999
monthly Min. flow of 371 cfs in August 1949-1999

L014033 Kankakee River SR 49 BRIDGE MP 86.7 102
General chemistry and nutrient samples taken August 19, 1999 DA 14326

1999.08.03 11:00:00	695 cfs	3.86 ft, rising
1999.08.11 10:00:00	494 cfs	3.11 ft, rising
1999.08.19 10:00:00	449 cfs	2.93 ft, rising
1999.08.26 10:00:00	577 cfs	3.43 ft, rising
1999.09.01 10:00:00	424 cfs	2.83 ft, falling

The USGS 1999 Water Year monthly mean flow of 971 cfs in August 1975-1999
monthly max. flow of 2432 cfs in August 1975-1999
monthly min. flow of 398 cfs in August 1975-1999

L014032 Cooks Ditch SR 49 BRIDGE **143**
General chemistry and nutrient samples taken August 19, 1999 DA 14325

L014031 Reeves Ditch SR 49 BRIDGE **186**
General chemistry and nutrient samples taken August 19, 1999 DA 14324

L014002 Crooked Creek SR 49 SOUTH OF KOUTS **519**
General chemistry and nutrient samples taken August 19, 1999 DA 14323 and DA 14329

L014029 Kankakee River BRAUM'S BRIDGE, CR 1700N, CR 100W **170**
General chemistry and nutrient samples taken August 19, 1999 DA 14322

L014028 Kankakee River JASPER CR 400 W BRIDGE **233**
General chemistry and nutrient samples taken August 19, 1999 DA 14321

L014027 Kankakee River US 231, PORTER/JASPER CO LINE **148** **300**
General chemistry and nutrient samples taken August 19, 1999 DA 14320

L014026 Kankakee River BRIDGE ON JASPER/NEWTON CO LINE RD 113
General chemistry and nutrient samples taken August 24, 1999 DA 14343

L014068 Kankakee River SR 55 BRIDGE, 1 MI S OF SHELBY 106 **150**
General chemistry and nutrient samples taken August 24, 1999 DA 14342

1999.08.03 09:00:00	713 cfs	3.01 ft, falling
1999.08.10 10:00:00	494 cfs	2.22 ft, falling
1999.08.17 11:00:00	453 cfs	2.06 ft, falling
1999.08.24 11:00:00	484 cfs	2.18 ft, rising
1999.08.31 09:00:00	489 cfs	2.20 ft, falling

The USGS 1999 Water Year monthly mean flow of 983 cfs in August 1924-1999
monthly Max. flow of 3058 cfs in August 1924-1999
monthly Min. flow of 402 cfs in August 1924-1999

L014022 Kankakee River US 41 BRIDGE, SCHNEIDER 72
General chemistry and nutrient samples taken August 24, 1999 DA 14337
and DA 14344

L014021 Kankakee River LAKE/NEWTON COUNTY/STATE LINE ROAD 52 **160**
General chemistry and nutrient samples taken August 24, 1999 DA 14336

THESE ARE ALL DITCHES THAT CONVERGE WITH THE Kankakee River IN ILLINOIS

L014025 BROWNS DITCH above IN00405 WWTP 49
General chemistry and nutrient samples taken August 24, 1999 DA 14341

L014023 Brown Ditch US 41 BRIDGE 100
General chemistry and nutrient samples taken August 24, 1999 DA 14338

L014003 Singleton Ditch **133** **440**
General chemistry and nutrient samples taken August 24, 1999 DA 14340

L014024 West Creek 2.8 MI NW OF SCHNEIDER 87
General chemistry and nutrient samples taken August 24, 1999 DA 14339

Laboratory reports

The following data packages and associated Chain of Custody and Stream Sampling Field Sheets have been forwarded to the TMDL work group, Toxicology and Chemistry Section, Assessment Branch, OWM, IDEM.

IDEM/32/01/3242/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, Week 1"
IDEM/32/01/3243/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, Week 2"
IDEM/32/01/3248/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, Week 3"
IDEM/32/01/3249/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, Week 4"
IDEM/32/01/3250/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, Week 5"
IDEM/32/01/3251/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, August 12, 1999"
IDEM/32/01/3252/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, August 19, 1999"
IDEM/32/01/3254/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, August 24, 1999"
IDEM/32/01/3259/1999
"Quality Assurance of (TMDL) Kankakee River Basin and Wyatt Ditch (Water) Analysis Data, August 26, 1999"